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AERIAL SURVEYS OF PINNIPED POPULATIONS IN THE CHANNEL ISLANDS NATIONAL PARK AND CHANNEL ISLANDS MARINE SANCTUARY: 1985-1986; 1986-1987

by

Brent S. Stewart and Pam Yochem

ADMINISTRATIVE REPORT LJ-88-15

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Aerial surveys of pinniped populations in the
Channel Islands National Park and Channel
Islands National Marine Sanctuary; 1985-1986; 1986-1987

By

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Aerial surveys of pinniped populations in the Channel Islands National Park and Channel Islands Marine Sanctuary; 1985-1986

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I. INTRODUCTION AND METHODS

The objective of these surveys was to document distribution and relative abundance of the following pinnipeds at Channel Islands National Park/Marine Sanctuary (CINP/CINMS)*: harbor seals (*Phoca vitulina richardsi*) during the annual peak (May-June molt haul-out, Survey I), California sea lions (*Zalophus californianus*) and northern fur seals (*Callorhinus ursinus*) during the peak of the breeding season (July, Survey II), and northern elephant seals (*Mirounga angustirostris*) during the peak of the breeding season (January-February, Survey III) and during the female/juvenile molt haul-out (April, Survey IV). Survey IV was also timed to document distribution and abundance of harbor seals when the greatest number of pups were ashore. We also recorded the abundance and distribution of Steller sea lions (*Eumetopias jubatus*) and Guadalupe fur seals (*Arctocephalus townsendi*) whenever we observed them. Timing of surveys (Table I) was comparable to that of surveys conducted since 1975 (Bonnell et al. 1980; Stewart 1981, 1982a, 1982b; Stewart and Yochem 1984a, 1985). During the surveys each island was circumnavigated at an altitude of approximately 170 m and 50-100 m offshore in a twin-engine Cessna 337 (Skymaster). Oblique photographs of pinnipeds at all hauling and rookery sites were taken using a 35 mm camera, motordrive, 75-250 mm and 28-80 mm zoom lenses and Kodak Ektachrome (200 ASA) film. The survey team consisted of a pilot, a primary observer/photographer and a second observer who also served as a data recorder.

Counts of pinnipeds were obtained by projecting processed slides on a large viewing screen and scoring each area for total numbers of pinnipeds present. Distribution and relative abundance of pinnipeds were coded by areas using number designations similar to those of previous studies (Bonnell et al. 1980; Stewart 1981, 1982a, 1982b; Stewart and Yochem 1984a, 1984b, 1985). An estimate of peak annual abundance is presented for harbor seals. For other species we describe their distribution and relative abundance.

*The islands included in the CINP/CINMS are San Miguel, Santa Cruz, Anacapa, and Santa Barbara islands.

II. RESULTS AND DISCUSSION

Environmental conditions and human disturbance evidently contributed to lower-than-expected counts during Surveys II (6 July 1985) and III (1 February 1986). The seas were very calm on 6 July, and had been since 4 July; this, combined with the holiday weekend, resulted in a great number of vessels (pleasure boats as well as commercial vessels, Table II) near the islands. In many cases the vessels had approached traditional pinniped haul-outs closely enough to have caused seals and sea lions to leave them. Large swells and wind-driven waves, resulting in unusually heavy surf, on 1 February probably accounted for an absence of pinnipeds at Anacapa Island, and for the very low numbers observed at Santa Cruz, Santa Rosa, and Santa Barbara islands. Many narrow beaches and rocky ledges generally used by pinnipeds were completely awash and therefore inaccessible as haul-outs.

Distribution and relative abundance of pinnipeds surveyed in the CINP/CINMS are presented in Tables III-XI and are discussed, by species, below. In cases where only a few individuals were encountered (e.g., California sea lions at Santa Cruz Island, results are presented in the text only.

Harbor seal (*Phoca vitulina richardsi*)

As in previous years, harbor seals were observed at all islands in the CINP/CINMS, and pups were observed at all islands except Santa Barbara Island. The number of seals hauled out was greatest at San Miguel and Santa Rosa islands (Tables III and IV), followed by Santa Cruz and Anacapa islands (Table V) and Santa Barbara Island (12 seals were hauled out there on 26 April 1986, 11 at area 325 and one at area 310). The number of harbor seals counted during the annual molt peak survey (1 June 1985) was 2541.

Of seals observed in April, pups accounted for 16% of those at San Miguel Island, 22% of those at Santa Rosa Island, 9% of those at Santa Cruz Island, and 7% of those at Anacapa Island. Two hundred and ninety-nine pups were counted at these islands in April, representing 16% of all seals observed then.

Northern elephant seal (*Mirounga angustirostris*)

San Miguel Island (Table VI) is the largest elephant seal rookery in the Southern California Bight and, perhaps, the world (Stewart, unpublished data). As in previous years, most elephant seal pups born at San Miguel island were observed at Adams Cove (area 111), South Cove (113), West Cove (116), Northwest Cove (118), Judith Rocks (161), Tyler Bight (150), Cardwell Point (145), and at beaches east and west of Crook Point (146, 147). Distribution of molting seals was also similar to previous years; most molting females and juveniles observed in April were hauled out at Judith Rocks, Tyler Bight, near Crook Point, and at South Cove, while most molting males (observed in July) were hauled out

at Adams Cove, South Cove, West Cove, Judith Rocks, Tyler Bight, and near Crook Point.

On 1 February 1986, we observed, 54 female elephant seals and 63 pups on Santa Barbara Island (Table VII) compared to 85 females and 63 pups in 1984 (28 January) and 115 females and 72 pups in 1985 (26 January). Santa Barbara Island was also used by a small number of molting females and juveniles in spring (Survey IV, Table VII) and molting males in summer (Survey II, Table VII).

Although elephant seals have occasionally been seen at Santa Rosa Island, and two pups were born there in January 1985 (Stewart and Yochem 1986), we did not observe any elephant seals there during surveys from June 1985 through April 1986. We did not observe any elephant seals at Santa Cruz or at Anacapa islands.

California sea lion (*Zalophus californianus*)

California sea lions were observed during all four surveys at San Miguel (Tables VIII and IX) and Santa Barbara (Table X) islands; these two islands remain the only rookeries for this species in the CINP/CINMS. Sea lions were hauled out at Santa Cruz Island in area 655 (Gull Island) during Survey I (30 sea lions and Survey II (26 sea lions), but no pups were observed. In 1984 (Stewart and Yochem 1985) we observed adult males at area 655 during the breeding season, but in 1985 only females and juveniles were hauled out there.

Sea lions were hauled out at Anacapa Island (area 680) during two surveys: Survey I (11 females and juveniles) and Survey IV (85 females and juveniles). There were no sea lions ashore during Survey II, probably due to human disturbance (Table II). As described earlier, high surf during Survey IV prevented any pinnipeds from hauling out at Anacapa Island then.

Northern fur seal (*Callorhinus ursinus*)

We observed northern fur seals at Castle Rock, San Miguel Island, during all four surveys and at Adams Cove, San Miguel Island, during Surveys I and II (Table XI). We counted approximately 1088 fur seals at the two rookeries on 6 July (Survey II), including 645 pups. Ground surveys indicated that 781 pups were born at Point Bennett and Castle Rock in 1985 (Stewart 1985).

Steller sea lion (*Eumetopias jubatus*) and Guadalupe fur seal (*Arctocephalus townsendi*)

We did not observe Steller sea lions or Guadalupe fur seals in the CINP/CINMS during any of our surveys.

III. ACKNOWLEDGMENTS

We thank Channel Islands Aviation (Camarillo, CA) for their professional service during these aerial surveys. We also thank the personnel of Range Scheduling, Pacific Missile Test Center, Pt. Mugu, California, for their assistance and cooperation in scheduling our surveys in the Pacific Missile Test Range. These aerial surveys were authorized under Marine mammal Permit No. 341, issued to B. S. Stewart. Funding was provided by the Channel Islands National Marine Sanctuary, NOAA.

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Table I. Timing and objectives of aerial surveys conducted in 1985 and 1986.

Survey No.	Survey mate	Island	Time Surveyed (Local Time)	Objective of Survey
I	1 June 1985	Anacapa (ANA) Santa Cruz (SCRI) Santa Rosa (SRI) San Miguel (SMI) Santa Barbara (SBI)	1052-1056, 1058-1120, 1124-1146, 1149-1222 1315-1321	<u>Phoca</u> annual peak abundance and distribution
II	6 July 1985	SMI SRI SCRI ANA SBI	1401-1430 1435-1449, 1452-1513, 1515-1525 1640-1650	<u>Zalophus</u> and <u>Callorhinus</u> breeding season distribution and relative abundance
III	1 Feb. 1986	ANA SCRI SRI ANA SBI	1047-1051, 1053-1120, 1124-1140, 1142-1230 1315-1319	<u>Mirounga</u> breeding season distribution and relative abundance
IV	26 April 1986	ANA SCRI SRI SMI SBI	1026-1030, 1032-1054, 1058-1121, 1124-1156 1246-1250	<u>Mirounga</u> Female/ juvenile molt peak distribution and relative abundance; <u>Phoca</u> peak pupping season distribution and abundance

Table II. Vessels observed near Anacapa, Santa Cruz, and Santa Rosa islands during Survey II (6 JULY 1985).

Location	Number of Vessels		
	Pleasure Boats	Commercial Vessels	Boston Whalers
Anacapa Island	41	9	7
Santa Cruz Island			
North side	187*	2	10
South side	46	2	3
Santa Rosa Island			
North side	12	2	0
South Side	18	4	1
Total	304	19	21

*40 pleasure boats at Pelican Bay

Table III. Distribution of harbor seals at San Miguel island, 1985-1986.

Area	1 June 1985 (Survey I) Total Pups		6 July 1985 (Survey II) Total	1 February 1986 (Survey III) Total	26 April 1986 (Survey IV) Total Pups	
145	9	0	0	11	42	11
146	223	24	119	0	150	24
147	47	6	0	0	50	7
150	9	1	28	0	8	2
172	5	1	0	0	0	0
122	104	11	62	73	117	10
123	0	0	0	0	8	0
130	295	11	0	82	193	33
142	150	9	37	40	52	8
144	12	0	0	0	34	10
Total	854	63	246	206	654	105

Table IV. Distribution of harbor seals at Santa Rosa Island, 1985-1986.

Area	1 June 1985 (Survey I)		6 July 1985 (Survey II)	1 February 1986 (Survey III)	26 April 1986 (Survey IV)	1986 Pups
	Total	Pups	Total	Total	Total	
611	0	0	0	0	48	7
612	0	0	0	0	55	9
613	0	0	8	0	28	3
615	188	12	0	29	76	11
617	21	2	0	0	0	0
618	9	0	0	0	0	0
619	5	0	0	0	0	0
621	171	13	63	0	128	15
624	23	2	2	0	37	9
625	0	0	10	0	55	25
626	544	73	212	0	264	71
Total	1149	102	295	29	691	150

Table V. Distribution of harbor seals at Santa Cruz and Anacapa islands 1985-1986.

Area	1 June 1985 (Survey I) Total Pups		6 July 1985 (Survey II) Total	1 February 1986 (Survey III) Total	26 April 1986 (Survey IV) Total Pups	
Santa Cruz						
643	8	0	0	0	9	0
645	53	0	0	0	16	1
646	12	1	0	0	0	0
647	47	2	0	0	79	5
649	7	1	0	0		
653	150	10	115	0	145	16
655	0	0	0	11	0	0
656	182	24	41	0	138	11
658	2	0	0	0	0	0
Total	461	38	156	0	387	33
Anacapa						
660	44	3	0	0	83	6
670	9	0	55	0	27	3
680	24	1	56	0	37	2
Total	77	4	111	11	147	11

Area	1 June 1985 (Survey I) Subadult Males, Adult Females, Juveniles and Yearlings		6 July 1985 (Survey II) Adult and Subadult Males		1 February 1986 (Survey III) Males Adult Females		26 April 1986 (Survey IV) Adult Females, Juveniles, and Yearlings	
111	284	78	230	1891	1785	266		
113	234	98	233	1045	965	541		
114	214	0	0	0	0	0	0	
115	0	0	37	6	2	98		
116	416	325	114	486	438	391		
117	0	0	0	0	0	28		
118	385	15	124	0	0	335		
120	44	0	31	53	34	0		
122	143	36	8	47	28	190		
123	35	0	12	8	5	61		
130	0	0	1	0	0	0		
145	0	2	14	36	30	0		
146	851	191	130	1318	1299	2268		
147	227	0	88	962	903	1005		
150	552	142	59	629	593	1276		
160	47	18	2	13	7	69		
161	649	140	16	206	187	853		
172	0	5	1	9	4	60		
Total	4081	1050	1100	6708	6280	7441		

Table VII. Distribution of northern elephant seals at San Miguel Island, 1985-1986.

Area	1 June 1985 (Survey I) Subadult Males, Adult Females, Juveniles and Yearlings		6 July 1985 (Survey II) Adult and Subadult Males		1 February 1986 (Survey III) Males Adult Females		26 April 1986 (Survey IV) Adult Females, Juveniles, and Yearlings	
302	10		0		5	1	2	50
303	0		0		0	0	0	5
304	35		0		5	19	22	0
305	10		0		0	0	0	111
308	28		15		1	6	8	7
309	0		0		4	15	19	13
311	113		0		2	13	12	125
316	0		0		0	0	0	49
322	34		0		0	0	0	2
Total	230		15		17	54	63	362

Table VIII. Distribution of northern elephant seals at San Miguel Island, 1985-1986.

Area	1 June 1985 (Survey I)			6 July 1985 (Survey II)		
	Adult Females		Pups	Adult Females		Pups
	Males	and Others		Males	and Others	
102	4	133	5	16	363	155
103	5	126	0	0	0	0
111	69	1378	0	232	370	696
112	0	0	0	0	0	0
113	47	883	0	72	1075	2335
114	8	125	0	18	114	163
115	16	375	0	103	1264	1760
116	57	953	0	114	1575	1711
117	0	0	0	29	295	807
118	58	571	0	70	750	675
119	3	167	0	18	247	125
120	0	0	0	60	0	0
122	9	0	0	0	64	0
150	24	512	0	299	665	0
160	9	336	0	12	435	37

Table VIII. (continued)

Area	1 June 1985 (Survey I)			6 July 1985 (Survey II)		
	Adult Females Males and Others		Pups	Adult Females Males and Others		Pups
161	17	404	0	4	330	15
171	9	161	0	12	97	18
172	4	64	3	8	48	23
173	1	43	2	0	0	0
Total	340	6231	10	1049	7578	8520

Table IX. Distribution of California sea lions at San Miguel Island, 1985-1986; Surveys III and IV.

Area	1 February 1986 (Survey III)	26 April 1986 (Survey IV)
	Adult Females and Others	Adult Females and Others
102	135	85
103	0	10
111	90	950
113	375	1085
115	325	0
116	950	525
117	0	1050
118	250	350
119	110	0
150	0	400
160	0	25
161	0	55
Total	2235	4535

Table X. Distribution of California sea lions at Santa Barbara Island, 1985-1986.

Area	1 June 1985 (Survey I) Adult Females		6 July 1985 (Survey II) Adult Females		1 February 1986 (Survey III) Adult Females		26 April 1986 (Survey IV) Adult Females	
	Males and Others		Males and Others	Pups	Adult Females and Others		Adult Females and Others	
302	2	40	4	61	18	14	36	
303	0	0	3	24	11	68	108	
304	3	60	7	55	25	0	0	
305	4	120	4	35	20	0	70	
308	0	12	0	0	0	38	0	
309	0	0	0	0	0	0	33	
310	0	18	0	0	0	0	0	
316	0	25	10	72	35	59	48	
317	6	178	21	243	165	100	85	
322	4	200	21	150	101	294	87	
325	0	51	3	50	15	0	0	
Total	19	704	73	690	390	573	467	

Table XI. Distribution of northern fur seals at San Miguel Island, 1985-1986.

Area	1 June 1985 (Survey I)		6 July 1985 (Survey II)		Pups	1 February 1986 (Survey III)		26 April 1986 (Survey IV)	
	Males	Subadult Males	Adult Females and Others	Males and Others		Adult Females and Others	Adult Females and Others	Adult Females and Others	Adult Females and Others
102	10	15	10	21	285	48		35	
111	1	0	7	24	360	0		0	
Total	11	15	17	45	645	48		35	

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I. INTRODUCTION AND METHODS

The objective of these surveys was to document distribution and relative abundance of the following pinnipeds at the Channel Islands National Park/Marine Sanctuary (CINP/CINMS)*: harbor seals (*Phoca vitulina richardsi*) during the annual peak (May-June molt haul-out, Surveys I and IV), California sea lions (*Zalophus californianus*) and northern fur seals (*Callorhinus ursinus*) during the peak of the breeding season (July, Survey II), and northern elephant seals (*Mirounga angustirostris*) during the female/juvenile molt haul-out (April, Survey III). Survey III was also timed to document distribution and abundance of harbor seals when the greatest number of pups were ashore. We also recorded the abundance and distribution of Steller sea lions (*Eumetopias jubatus*) and Guadalupe fur seals (*Arctocephalus townsendi*) whenever we observed them. Timing of surveys (Table I) was comparable to that of surveys conducted since 1975 (Bonnell et al. 1980; Stewart 1981, 1982a, 1982b; Stewart and Yochem 1984a, 1985, 1986b). During the surveys each island was circumnavigated at an altitude of approximately 170 m and 50-100 m offshore in a twin-engine Cessna 227 (Skymaster). Oblique photographs of pinnipeds at all hauling and rookery sites were taken using a 35 mm camera, motordrive, 75-250 mm and 28-80 mm zoom lens and Kodak Ektachrome (200 ASA) film. The survey team consisted of a pilot, primary observer/photographer and a second observer who also served as a data recorder.

Counts of pinnipeds were obtained by projecting processed slides on a large viewing screen and scoring each area for total numbers of pinnipeds present. Distribution and relative abundance of pinnipeds were coded by areas using number designations similar to those of previous studies (Bonnell et al., 1980; Stewart 1981, 1982a, 1982b; Stewart and Yochem 1984a, 1984b, 1985, 1986b). An estimate of peak annual abundance is presented for harbor seals. For other species we describe their distribution and relative abundance.

*Included in the CINP/CINMS are San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara islands.

II. RESULTS AND DISCUSSION

The distributions and relative abundances of pinnipeds that were surveyed in the CINP/CINMS are presented in Tables II through IX and are discussed, by species, below. In cases where only a few individuals were encountered (e.g., California sea lions on Santa Cruz Island) data are presented in the text only.

Harbor Seal (*Phoca vitulina richardsi*)

Harbor seals were observed on all islands of the CINP/CINMS, except on Santa Barbara Island, during all surveys (Tables II, III, IV, X). We observed 16 seals on Santa Barbara Island (Area 319) on 30 May 1987 but observed none there during the other surveys. Pups accounted for about 7% of all seals counted on 9 April 1987 (9% less than in 1986; Stewart and Yochem 1986) and the greatest number (25) was seen on San Miguel Island. Overall, about 36% fewer seals were counted on the islands in 1987 than in 1986; counts were lower for all islands except Santa Barbara in 1987 (Table X). The lower total counts of seals in May 1987 and counts of pups in April 1987, compared to 1986, may reflect differences in haul-out patterns related to differences in weather, distribution and abundance of prey, or may perhaps be related to increased mortality of seals in gill-net fisheries in recent years (Stewart et al. 1987). Data on haul-out patterns of individual seals are critical to confident interpretations of short-term changes in the abundance of harbor seals ashore (e.g., Yochem and Stewart 1987).

Northern elephant seal (*Mirounga angustirostris*)

The distribution of molting juveniles and females in spring on San Miguel Island was similar to that in previous years. Most seals were hauled out on beaches on the south coast (areas 146, 147, and 150; Table V). Most molting adult and subadult males hauled out in summer at West Cove on Point Bennett and on beaches in Tyler Bight, Area 150; Table V).

Relatively few seals hauled out on Santa Barbara Island to molt in spring and summer (Table VI).

Although pups were born on Santa Rosa Island in 1985 (Stewart and Yochem 1986a) and in 1987 (Stewart et al. 1988) we observed no seals there in spring and summer of 1986 and 1987. We observed no seals on Santa Cruz or Anacapa islands during the surveys.

California sea lion (*Zalophus californianus*)

Within the CINP/CINMS, California sea lions breed only on San Miguel (including Castle Rock) and Santa Barbara islands and a very few pups are born on Richardson Rock (Table VII). On San Miguel Island, virtually all sea lions haul-out and breed on the beaches and headlands on Pt. Bennett (Table VII). Relatively few

haul out seasonally along the shorelines of Tyler Bright, on Castle Rock and on Richardson Rock (Table VIII).

We counted 72 juveniles and females hauled out on the south side of East Anacapa Island on 31 May 1986 and eight there on 27 July 1986 but observed none during the other surveys.

Four sea lions were hauled out at Fraser Pt. on Santa Cruz Island and ten juveniles and females were hauled out on Gull Island on 27 July 1986. On 30 May 1987 we counted seven sea lions on Gull Island and eleven others rafting in the water nearby. We observed no sea lions on Santa Cruz or Gull islands on 31 May 1986 or 19 April 1987 and observed none on Santa Rosa Island during any survey.

Northern fur seals (*Callorhinus ursinus*)

Northern fur seals were observed only at Adams Cove on San Miguel Island and on Castle Rock near Pt. Bennett, San Miguel Island, during each survey (Table IX). On 27 July 1986 we counted 328 pups on Castle Rock and 346 pups at Adams Cove (Table IX). More precise ground surveys indicated that 670 pups were born at Adams Cove and 576 on Castle Rock in 1986 (Gearin and Antonelis 1986).

Steller sea lion (*Eumetopias jubatus*) and Guadalupe fur seal (*Arctocephalus townsendi*).

We did not observe Steller sea lions or Guadalupe fur seals in the CINP/CINMS during any of the surveys.

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Table I. Timing and objectives of aerial surveys conducted in 1986 and 1987.

Survey No.	Survey Date	Island*	Time surveyed (Local Time)	Objective of Survey
II	31 May 1986	ANA	1233-1239,	<u>Phoca</u> annual peak abundance and distribution
		SCRI	1241-1308,	
		SRI	1317-1331,	
		SMI	1334-1353	
		SBI	1439-1444	
	27 July 1986	ANA	1115-1119,	<u>Zalophus</u> and <u>Callorhinus</u> breeding season distribution and relative abundance
		SCRI	1120-1140,	
		SRI	1142-1201,	
		SMI	1203-1235	
		SBI	1319-1326	
III	19 April 1987	ANA	1109-1114,	<u>Mirounga</u> female/juvenile molt peak distribution and relative abundance; <u>Phoca</u> peak annual peak abundance
		SCRI	1115-1133,	
		SRI	1135-1159,	
		SMI	1202-1238	
		SBI	1329-1333	
IV	30 May 1987	ANA	1049-1052,	<u>Phoca</u> annual peak abundance and distribution
		SCRI	1055-1115,	
		SRI	1124-1137,	
		SMI	1138-1158	
		SBI	1243-1258	

*ANA = Anacapa; SCRI = Santa Cruz; SRI = Santa Rosa; SMI = San Miguel; SBI = Santa Barbara.

Table II. Distribution of harbor seals on San Miguel Island, 1986-1987.

Area	31 May 1986 (Survey I) Total	27 July 1986 (Survey II) Total	19 April 1987 (Survey III) Total	Pups	30 May 1987 (Survey IV) Total
122	95	31	68	4	81
123	14		6		8
130	449	103	155	12	390
142	205	170	26	3	138
144	13		65	6	24
145					20
146	169	81	24		163
147	181				
150	41	26			
172	4				
Total	1171	411	344	25	824

Table III. Distribution of harbor seals on Santa Rosa Island, 1986-1987.

Area	31 May 1986 (Survey I) Total	27 July 1986 (Survey II) Total	19 April 1987 (Survey III) Total	30 May 1987 (Survey IV) Total
611				5
612	21			
613	295	49	33	1
615		4	129	4
616		23		170
				15
617	60			
618	6			
619	17			
621	205			23
622				127
624	23	21	41	3
625	26		37	
626	577	21		412
629				8
Total	1230	118	240	760

Table IV. Distribution of harbor seals at Santa Cruz and Anacapa Islands, 1986-1987.

Area	31 May 1986 (Survey I) Total	27 July 1986 (Survey II) Total	19 April 1987 (Survey III) Total	30 May 1987 (Survey IV) Total
Santa Cruz Island				
643	24		16	17
645	67		37	45
646	10		6	
647	58			
648	52	15	76	44
649	18		14	4
653	226	97		149
655				10
656	331	28	67	115
Total	786	140	216	384
Anacapa Island				
660	132	48	69	95
670	29	29	58	29
680	18	8	34	43
Total	179	85	161	167

Table V. Distribution of northern elephant seals on San Miguel Island, 1986-1987.

Area	31 May 1986 (Survey I) Total	27 July 1986 (Survey II) Total	19 April 1987 (Survey III) Total	30 May 1987 Survey IV) Total
111	324	55	192	150
113	403	65	807	350
114		104		
116	664	400	520	435
118	406	45	126	
122	150	30	214	213
123	41		45	25
130				19
146	776	49	1192	858
147	537	70	580	265
150	1561	253	1092	1668
161	127	11		35
172	53		24	3
173			18	38
Total	5042	1082	4801	4049

Table VI. Distribution of northern elephant seals on Santa Barbara Island, 1986-1987.

Area	31 May 1986 (Survey I) Total	27 July 1986 (Survey II) Total	19 April 1987 (Survey III) Total	30 May 1987 (Survey IV) Total
301			42	
302	18	8	20	11
305			60	61
309	15		20	16
310		19	119	52
312	87			4
314	30			36
322	21		66	15
Total	171	27	327	195

Table VII. Distribution of California sea lions on San Miguel Island, 1986-1987.

Area 31 May 1986 27 July 1986 19 April 1987 30 May 1987
 (Survey I) (Survey II) (Survey III) (Survey IV)

	A*	B*	C*	A	B	C	D*	A	B	C	A	B	C
102	11	6	248	10	3	180	96				61	23	95
103				6	4	75	5				5	2	855
111	38	64	955	34	39	900	810				32	16	65
112	8	3	175	9	2	165	83						949
113	32	29	962	33	42	1050	958						
114				3		25							
115	39	18	711	45	19	856	708				12	8	290
116	18	24	709	55	21	1009	853				46	24	648
117	6	5	265	58	12	952	1024				18	14	175
118	29	21	590	24	3	650	507				12	3	598
119	12	8	349	25	2	565	378				14		365
122	28	12											
146		13	200										
150	105	83	1103	73	43	810	35				101	42	120
160				31	3	350	218				8		395
161	7	5	286	6	2	175	10				5	2	168
171			83									1	75
172	6	2	50	4		25	13						15
173													25
Total	339	293	6686	416	195	7787	5698				314	135	5972

A* = Adult Males; B = Subadult Males; C = Females and juveniles; D = Pups.

Table VIII. Distribution of California sea lions on Santa Barbara Island, 1987.

Area 31 May 1986 27 July 1986 19 April 1987 30 May 1987
 (Survey I) (Survey II) (Survey III) (Survey IV)

	A*	B*	C*	A	B	C	D*	A	B	C	A	B	C
301													
302	1	3	25	3	1	40				30			
303		4	41										
304	1	8	45										
305													
309	2	4	78	8	2	75	46			150	2	1	75
310				4	1	45	23				1	1	8
311		2	29										
312	4	1	117	1	2	25	4						
314	2		26										
316	4		10										
317	8	4	217	7	1	186	209			40	2	1	5
322	7	3	67	15	8	265	284			35	4	1	78
325	4	1	87							5	5	3	195
										3			
Total	33	30	742	34	15	636	566			35	16	13	386
										392			

*A = Adult males; B = Subadult males; C = Females and juveniles; D = Pups

Table IX. Distribution of northern fur seals on San Miguel Island, 1986-1987.

Area 31 May 1986 27 July 1986 19 April 1987 30 May 1987
 (Survey I) (Survey II) (Survey III) (Survey IV)

	A*	B*	C*	A	B	C	D*	C	A	B	C
102	4	12	18	28	16	215	328	38	3	10	25
111	3	16	24	22	17	155	346	12	4	12	21
Total	7	28	42	50	33	370	674	7	7	22	46

*A = Adult males; B = Subadult males; C = Females and juveniles; D = Pups

Table X. Seasonal abundance of harbor seals on the islands of the CINP/CINMS, 1986-1987.

Island	31 May 1986 (Survey I) Total	27 July 1986 (Survey II) Total	19 April 1987 (Survey III) Total	30 May 1987 (Survey IV) Total
San Miguel	1171	411	344	824
Santa Rosa	1230	118	240	760
Santa Cruz	786	140	216	384
Anacapa	179	85	161	167
Santa Barbara	0	0	0	16
Total	3366	754	961	2151

